Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of the claims in the application:

Listing of Claims:

1. – 20. (cancelled)

21. (new) A crystalline substrate comprising an optical multi-layer system thereon, which substrate is obtainable by

(a) applying a first free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to at least one surface of a crystalline substrate;

(b) at least one of polymerizing and polycondensing the organic groups of the solid particles to form a first organically crosslinked layer on the at least one surface;

(c) applying a second free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically crosslinked layer of (b), the second composition giving rise to a different refractive index than the first composition;

(d) at least one of polymerizing and polycondensing the organic groups of the solid particles of the applied second composition to form a second organically crosslinked layer on the first organically crosslinked layer;

(e) optionally, applying a further free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically crosslinked layer of (d) and at least one of polymerizing and polycondensing the organic groups of the solid particles of the further composition to form a further organically crosslinked layer on the second organically crosslinked layer;

(f) optionally, repeating (e) one or more times to form one or more further organically crosslinked layers; and

(g) single-stage thermal consolidation of the organically crosslinked layers present and burnout of organic constituents thereof;

with the proviso that for the uppermost layer,

(1) the at least one of polymerizing and polycondensing of the organic groups of the solid particles of the applied composition to form an organically crosslinked layer may optionally be effected concurrently with (g) or

(2) alternatively and optionally, the nanoscale inorganic solid particles do not comprise a polymerizable or polycondensable organic group, so that, in this case, for the uppermost layer, a polymerization or polycondensation of groups of the solid particles with formation of organic crosslinking does not take place before or during (g).

22. (new) The substrate of claim 21, wherein the crystalline substrate comprises one or more of silicon, lithium niobate, lithium tantalate, quartz, sapphire, PbS and selenium.

23. (new) The substrate of claim 21, wherein the crystalline substrate comprises at least one of a precious stone and a semi-precious stone.

24. (new) The substrate of claim 21, wherein the crystalline substrate is planar.

25. (new) The substrate of claim 21, wherein the crystalline substrate is curved.

26. (new) The substrate of claim 21, wherein the substrate is transparent.

27. (new) The substrate of claim 21, wherein two sides of the substrate are provided with an optical multi-layer system.

28. (new) The substrate of claim 21, wherein the crystalline substrate comprises one or more of a sheet, a watchglass, an instrument cover glass, a wafer, a crystalline detector and an optical filter.

29. (new) The substrate of claim 28, wherein the crystalline substrate comprises at least one of a sheet of sapphire, a watchglass of sapphire and a silicon wafer.

30. (new) The substrate of claim 22, wherein the nanoscale particles comprise one or more compounds selected from oxides, sulfides, selenides and tellurides of semimetals and metals.

31. (new) The substrate of claim 30, wherein the polymerizable or polycondensable organic groups comprise organic radicals which comprise at least one of a (meth)acryloyl group, a vinyl group, an allyl group and an epoxy group.

32. (new) The substrate of claim 29, wherein the nanoscale particles comprise one or more compounds selected from SiO_2, TiO_2, ZrO_2, ZnO, Ta_2O_5, SnO_2 and Al_2O_3 and the polymerizable or polycondensable organic groups comprise organic radicals which comprise at least one of a (meth)acryloyl group, a vinyl group, an allyl group and an epoxy group.

33. (new) The substrate of claim 21, wherein the optical multi-layer system comprises an interference layer system.

34. (new) The substrate of claim 33, wherein the optical multi-layer system comprises an antireflection layer system.

35. (new) A process for producing a crystalline substrate with an optical multi-layer system thereon, comprising:

(a) applying a first free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to at least one surface of a crystalline substrate;

(b) at least one of polymerizing and polycondensing the organic groups of the solid particles to form a first organically crosslinked layer on the at least one surface;

(c) applying a second free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically crosslinked layer of (b), the second composition giving rise to a different refractive index than the first composition;

(d) at least one of polymerizing and polycondensing the organic groups of the solid particles of the applied second composition to form a second organically crosslinked layer on the first organically crosslinked layer;

(e) optionally, applying a further free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically

crosslinked layer of (d) and at least one of polymerizing and polycondensing the organic groups of the solid particles of the further composition to form a further organically crosslinked layer on the second organically crosslinked layer;

(f) optionally, repeating (e) one or more times to form one or more further organically crosslinked layers; and

(g) single-stage thermal consolidation of the organically crosslinked layers present and burnout of organic constituents thereof;

with the proviso that for the uppermost layer,

(1) the at least one of polymerizing and polycondensing of the organic groups of the solid particles of the applied composition to form an organically crosslinked layer may optionally be effected concurrently with (g) or

(2) alternatively and optionally, the nanoscale inorganic solid particles do not comprise a polymerizable or polycondensable organic group, so that, in this case, for the uppermost layer, a polymerization or polycondensation of groups of the solid particles with formation of organic crosslinking does not take place before or during (g).

36. (new) The process of claim 35, wherein one or more organically crosslinked layers are formed at a temperature of up to about 150°C.

37. (new) The process of claim 36, wherein one or more organically crosslinked layers are formed at a temperature of up to about 130°C.

38. (new) The process of claim 35, wherein one or more organically crosslinked layers are formed by at least one of photochemical polymerization and polycondensation.

39. (new) The process of claim 35, wherein (g) is carried out at a temperature of from 400°C to 800°C.

40. (new) The process of claim 36, wherein (g) is carried out at a temperature of from 400°C to 600°C.

41. (new) The process of claim 39, wherein (g) is carried out in such a way that heating of the crosslinked layer(s) is effected from outside inward in a direction toward the crystalline substrate.

42. (new) The process of claim 35, wherein in (g) a heating rate of the crosslinked layer(s) is at least 100°K/min.

43. (new) The process of claim 35, wherein the nanoscale particles comprise one or more compounds selected from semimetal and metal compounds.

44. (new) The process of claim 43, wherein the nanoscale particles comprise one or more compounds selected from oxides, sulfides, selenides and tellurides of semimetals and metals.

45. (new) The process of claim 43, wherein the nanoscale particles comprise one or more compounds selected from SiO_2, TiO_2, ZrO_2, ZnO, Ta_2O_5, SnO_2 and Al_2O_3.

46. (new) The process of claim 35, wherein the polymerizable or polycondensable organic groups comprise organic radicals which comprise at least one of a (meth)acryloyl group, a vinyl group, an allyl group and an epoxy group.

47. (new) The process of claim 35, wherein the solid particles have been produced by surface modification of nanoscale solid particles to provide them with polymerizable or polycondensable organic groups.

48. (new) The process of claim 35, wherein the solid particles have been produced from at least one compound comprising at least one polymerizable or polycondensable group.

49. (new) The process of claim 35, wherein the inorganic solid particles have been produced by a sol-gel process.

50. (new) The process of claim 35, wherein at least one of the first and second compositions has a pH of from 3 to 8.